

WHAT IS CLAIMED IS:

1. A clean box comprising:

a box body having an opening in a bottom;

a lid member for closing said opening;

5 an annular groove formed so as to surround said opening on at least one side of said box body or said lid member to define a suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box body; and

10 on intake/exhaust port for allowing vacuum exhaust/release of said annular groove from the outside.

2. A clean box according to claim 1, further  
15 comprising a valve provided on said lid member for allowing gas to be introduced and discharged for replacement of the gas within an interior of the clean box.

20 3. A clean box according to claim 1, further comprising a mechanical latch for preventing said lid member from falling apart from said box body.

25 4. A clean box according to claim 3, wherein said mechanical latch has a mechanism for opening/closing said latch from the outside on the side of said lid member.

5. A clean box according to claim 2, wherein said intake/exhaust ports and said valve are provided together on the same side surface of said box body.

5           6. A clean transfer method using a clean box comprising: a box body having an opening in a bottom; a lid member for closing said opening; an annular groove formed so as to surround said opening on at least one of said box body and said lid member to define a  
10 suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box body; and an intake/exhaust port for allowing vacuum exhaust/release of said annular groove from the outside, comprising the steps of:  
15           disposing the clean box, sucked by vacuum discharging said annular groove, on a load port of a clean device whose interior is kept under a clean environment and having a box lid opening/closing mechanism for opening/closing the lid member of the  
20 clean box, so that said lid member and the box lid opening/closing mechanism on the side of the load port are aligned to confront with each other with said lid member facing downward;  
              releasing vacuum in the suction space through said  
25 intake/exhaust port by a mechanism for releasing the vacuum provided on the load port to thereby open said lid member; and

picking up an article to be transferred within the clean box and moving the article to the clean device.

7. A clean transfer method according to claim 6,  
5 further comprising the steps of:

closing said lid member of the clean box by said  
box lid opening/closing mechanism after the article to  
be transferred that has been subjected to a process in  
the clean device has been returned back to the clean  
10 box; and

evacuating the suction space through a gas exhaust  
mechanism provided on the load port to suck together  
said lid member and said box body.

15 8. A clean transfer method according to claim 6,  
wherein said clean box has a valve for allowing gas in  
the interior of said box to be replaced, the method  
further comprising the steps of returning back to the  
clean box the article to be transferred that has been  
20 subjected to the process in the clean device, closing  
the lid member of the clean box, and performing the  
replacement of gas in the space of the interior of the  
clean box through the valve after the suction space is  
evacuated through said gas discharge mechanism so that  
25 the lid member and the box body are sucked together.

9. A clean transfer method according to claim 6, wherein said clean box has a mechanical latch for preventing the lid member from falling apart from the box body, and said box lid opening/closing mechanism  
5 releases the mechanical latch before the release of vacuum of the suction space.

10. A clean transfer method according to claim 9, wherein the mechanical latch is effected after the  
10 suction space has been evacuated so that the lid member and the box body have been sucked together, after the article to be transferred that has been subjected to the process in the clean device has been returned back to the clean box.

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11. A clean transfer system comprising:  
a clean box comprising: a box body having an opening in a bottom; a lid member for closing said opening; an annular groove formed so as to surround  
20 said opening on at least one of said box body and said lid member to define a suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box body; and an intake/exhaust port for allowing vacuum  
25 exhaust/release of said annular groove from the outside, and

a load port of a clean device whose interior is kept under a clean environment and having a box lid opening/closing mechanism for opening/closing the lid member of the clean box,

5            wherein said clean box is disposed so that said lid member and the box lid opening/closing mechanism on the side of the load port are aligned to confront with each other with said lid member downwardly, and

             said load port has a device for vacuum  
10    exhausting/releasing said suction space through said intake/exhaust port of the clean box.

             12. A clean transfer system according to claim 11, wherein said clean box has a valve device for  
15    allowing gas to be introduced and discharged for replacement of the gas in said clean box.

             13. A clean transfer system according to claim 12, wherein said valve device comprises a gas input  
20    valve for introducing a non-oxidizing gas into the interior of the clean box and a gas output valve for discharging the gas within the clean box to the outside.

25            14. A clean transfer system according to claim 12, wherein said load port has a means for replacement

of gas in the interior of the clean box in cooperation with said valves device.

15           15. A clean transfer system according to claim 13, wherein said load port has a gas feed device in cooperation with the gas input valve and a gas discharge device in cooperation with the gas output valve.

10           16. A clean transfer system according to claim 14, wherein said intake/exhaust port and said valve device are provided on the same single side surface of the clean box body, and the device for vacuum exhausting/releasing and the device for replacement of  
15           the gas in the interior of the clean box are constituted as a single unit so that the clean box may be accessed by one operation.

            17. A clean box comprising:  
20           a box body having an opening in one surface thereof;  
            a lid member for closing said opening;  
            an annular groove formed so as to surround said  
            opening on at least one of said box body and said lid  
25           member to define a suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box body; and

an intake/exhaust port for allowing vacuum exhaust/release of said annular groove from the outside, formed on said lid member.

5           18. A clean box according to claim 17, further comprising a valve device for allowing the gas to be introduced or discharged for replacement of gas in the interior of the clean box is provided on the lid member.

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          19. A clean box according to claim 17, further comprising a mechanical latch for preventing the lid member from falling apart from the box body.

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          20. A clean box according to claim 19, wherein said mechanical latch has a mechanism for opening/closing said latch from the outside on said lid member side.

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          21. A clean transfer method using a clean box comprising: a box body having an opening in a bottom; a lid member for closing said opening; an annular groove formed so as to surround said opening on at least one of said box body and said lid member to define a  
25           suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box body; and an intake/exhaust port

for allowing vacuum exhaust/release of said annular groove from the outside, formed on the lid member, comprising the steps of:

- disposing the clean box, sucked by vacuum
- 5 discharging said annular groove, on a load port of a clean device whose interior is kept under a clean environment and having a box lid opening/closing mechanism for opening/closing the lid member of the clean box, so that said lid member and the box lid
- 10 opening/closing mechanism on the side of the load port are aligned to confront with each other;
- releasing vacuum in the suction space by a box lid opening/closing mechanism on the load port through said intake/exhaust port provided on the lid member of the
- 15 clean box to thereby open said lid member; and
- picking up an article to be transferred within the clean box and moving the article to the clean device.

- 22. A clean transfer method according to claim
- 20 21, further comprising the steps of:

- closing said lid member of the clean box by said box lid opening/closing mechanism after the article to be transferred that has been subjected to a process in the clean device has been returned back to the clean
- 25 box; and

evacuating the suction space through said intake/exhaust mechanism to suck together said lid member and said box body.

5           23. A clean transfer method according to claim 21, wherein said clean box has a valve for allowing gas in the interior of said box to be replaced, the method further comprising the steps of:

          returning back to the clean box the article to be  
10 transferred that has been subjected to the process in the clean device;

          closing the lid member of the clean box; and

          performing the replacement of gas in the interior  
of the clean box through the valve after the suction  
15 space is evacuated through said intake/exhaust mechanism so that the lid member and the box body are sucked together.

          24. A clean transfer method according to claim  
20 21, wherein said clean box has a mechanical latch for preventing the lid member from falling apart from the box body, said box lid opening/closing mechanism releases the mechanical latch before the release of vacuum of the suction space.

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          25. A clean transfer method according to claim 24, wherein the mechanical latch is effected after the

suction space has been discharged and the lid member and the box body have been sucked together, after the article to be transferred that has been subjected to the process in the clean device has been returned back  
5 to the clean box.

26. A clean transfer system comprising:

a clean box comprising: a box body having an opening in one surface thereof; a lid member for  
10 closing said opening; an annular groove formed so as to surround said opening on at least one of said box body and said lid member to define a suction space sealed between said lid member and said box body under the condition that said lid member is mounted on said box  
15 body; and an intake/exhaust port for allowing vacuum exhaust/release of said annular groove from the outside, formed on said lid member, and

a load port of a clean device whose interior is kept under a clean environment and having a box lid  
20 opening/closing mechanism for opening/closing the lid member of the clean box,

wherein said clean box is disposed so that said lid member and the box lid opening/closing mechanism on the side of the load port are aligned to confront with  
25 each other with said lid member facing downward, and

said box lid opening/closing mechanism of the load port releases the vacuum of the suction space through

said intake/exhaust port formed on said lid member of the clean box, opens said lid member, and picks up an article to be transferred in the interior of the clean box.

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27. A clean transfer system according to claim 26, wherein said box lid opening/closing mechanism closes the lid member of the clean box after the article to be transferred that has been subjected to a process in the clean device has been returned into the interior of the clean box, and said lid member and said box body are sucked together by evacuated the suction space through said intake/exhaust mechanism.

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28. A clean transfer system according to claim 26,

wherein: said clean box has a valve for allowing the gas in the interior of the clean box to be replaced; and said load port further comprises gas replacement device for replacing the gas in the clean box through said valve, and

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wherein:

said box lid opening/closing mechanism returns back to the clean box the article to be transferred that has been subjected to the process in the clean device, and closes the lid member of the clean box; and

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the replacement of the gas in the space in the interior of the clean box is replaced through the valve after the suction space has been evacuated through said intake/exhaust mechanism so that the lid member and the box body are sucked together.

29. A clean transfer system according to claim 26,

wherein: said clean box has a mechanical latch for preventing the lid member from falling apart from the box body; and said box lid opening/closing mechanism further comprises a latch opening/closing mechanism for opening/closing the latch from said lid member side, and

wherein the mechanical latch is released before the release of the vacuum of the suction space by said latch opening/closing mechanism.

30. A clean transfer system according to claim 29, wherein said latch opening/closing mechanism effects the mechanical latch after the suction space has been evacuated and the lid member and the box body have been sucked together, after the article to be transferred having been subjected to a process in the clean device is returned back to the clean box.